



A STUDY ON ANTIMICROBIAL FINISHES USING ACALYPHA INDICA HERBAL EXTRACT ON COTTON SOCKS FOR HEALING OF CRACKED FEET

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ABSTRACT

An eco-friendly natural antimicrobial finishes has been prepared from natural extract for textile application. The natural product bio-active agents such as ACALYPHA INDICA (KUPPAIMENI) and (ETHANOL) extract of herbal product for antimicrobial finishes of textile substances. Herbal product from acalypha indica and ethanol has been applied to cotton socks by the method of direct application in wet condition; both extract shows the antimicrobial activity. After investigation of cotton socks of antimicrobial finish has been used by the patients cracked feet and the results have been observed that cracked healing action is good on acalypha indica.

KEYWORDS: ANTIMICROBIAL FINISHES, ACALYPHA INDICA, SHOXLET EXTRACTION.

INTRODUCTION

A textile is a cloth which is either woven by hand or machine. "TEXTILE" "has traditionally meant, "Woven Fabric". The term comes from Latin word "Texture", meaning to weave.

A textile or cloth is a flexible material consisting of network of natural or artificial fibers often referred to as thread or yarn. Yarn is produced by spinning raw fibers of wool, flax, cotton or other material to produce long strands. Textiles are formed by weaving, knitting, crocheting, knotting or pressing fibers together (felt) cloth may be used synonymously with fabric used for a specific purpose. (Thames & Hudson, year 1999).

"Clothing is to the body what education is to the mind. Clothing consists of similar elements for everyone, yet it varies according to the taste, attitude, order, to it. Clothing, coverings and garments intended to be worn on the human body. The words cloth and clothing are related, the first meaning fabric or textile, and the second meaning fabrics used to cover the body. The earliest garments were made of leather and other non fabrics, rather than of cloth, but these non fabric garments are included in the category of clothing. (Shella Jefferson, year 2005)

Technical textile main principles involved in the selection of raw materials and their conversion into yarns and fabrics followed by dyeing, finishing and coating of technical textiles are explored, followed by the raw materials, processing techniques, finishing, specifications, properties special technical and commercial features of a wide range of specific areas of application. (Aravin (2009)

Medical Textiles are the products and constructions used for medical and biological applications and are used primarily for first aid, clinical and hygienic purposes. It consists of all those textile materials used in health and hygienic.

In textile manufacturing, finishing refers to the processes that convert the woven or knitted cloth into a usable material and more specifically to any process performed after dyeing the yarn or fabric to improve the look, performance, or "hand" (feel) of the finished textile or clothing. Some finishing techniques such as bleaching and dyeing are applied to yarn before it is woven while others are applied to the grey cloth directly after it is woven. (Dattilo.P.P., 2002)

The object of finishing is to add attraction or desirability to fabric. There are also specialization finishes. Where function is to make the fabric especially suitable for a particular purpose. (Jewelrawl, year 2005)

Antibacterial textiles have been developed for use in the medical industry for some time. Currently, the antimicrobial textiles used in the health care industry are knitted cotton socks. Some of the treatments used are harmful to our environment not only because of the chemicals used in the treatments but also because the treated textiles are not reusable, but here we can use the herbs treated socks more than two times. (Chardra RT, Kumar RK, Rajendran R, 2004)

A wide variety of diseases and medical problems represent a challenging threat to humans, who since ancient times have searched for natural compounds from plants, animals, and other sources to treat them. Although the process of finding effective treatments against fatal diseases is difficult, extensive searches for natural bioactive compounds have previously yielded some successful results. The isolation and identification of specific natural compounds led to the development

of folk medicine, and humans learned to separate the isolates into medicinal drugs, which could be used to treat different diseases, and poisonous substances, which could be used for nonmedical purpose. (James D wattson, year- 2004) Socks were made from many different materials over the years, but in 1938, cotton became the material of choice. The sock in particular didn't become popular until World War II when cotton rations made it difficult to use as much material for the longer tube or crew socks. They were considered trendy because of their lightweight feel and shorter cut, as well as their material convenience. Socks have been in circulation ever since, and past the 1960s, they have also been a common staple for both foot support and style.

Socks also provide a unique support to the wearer by offering a lightweight breathability factor. Their moisture absorption design allows the foot to feel insulated and comfortable in either hot or cold conditions. These features make the sock appropriate for both active wear and lounge wear and provide the wearer with the utmost comfort for either situation.

(<http://www.wiki.org.wikipedia.com>)

Kuppaimeni or Acalypha Indica is a common weed that comes up in Chennai after the rain in the open areas. It grows luxuriously on heaps of manure or rubbish (kuppa) and thus it was called Kuppaimeni in Tamil. This plant is of the Euphorbiaceae family.

Kuppaimeni is a weed that grows to a height of about a foot. The leaves are serrated at edges and look deep green oval to round in shape. When viewed from above the leaves look like arranged petals of rose. There is no mention of this plant in Ayurvedic texts. The root spreads wide and do not go deep which makes it easy to pull it out. This weed grows fast after rains and finishes its lifecycle before the hot April and May. (Kombo VP, "Herbal medicine" Current Science (2000)

METHODS OF EXTRACTION

A **Soxhlet extractor** is a piece of laboratory apparatus invented in 1879 by Franz von Soxhlet. It was originally designed for the extraction of a liquid from a solid material. Typically, a Soxhlet extraction is used when the desired compound has a limited solubility in a solvent, and the impurity is insoluble in that solvent. It allows for unmonitored and unmanaged operation while efficiently recycling a small amount of solvent to dissolve a larger amount of material.

A Soxhlet Extractor has three main sections: A percolator (boiler and reflux) which circulates the solvent, a thimble (usually made of thick filter paper) which retains the solid to be leached, and a siphon mechanism, which periodically empties the thimble. The project is aimed at creating a repository of knowledge that will facilitate effective antibacterial finishes in organic cotton (socks) by using herbal product (KUPPAIMENI AND ETHANOL). (Erdogrul O.J (2002)

BACTERIA USING IN MEDICAL TEXTILE

Bacteria are generally classified as either helpful or harmful. Bacteria can be found everywhere, and appear on every surface and every part of the human body. The helpful bacteria are those commonly found in yogurt and in the making of cheeses, and are good for the intestinal tract. On the other hand, the harmful bacteria are those that you may be more familiar with, and are the very things that cause disease and infection. Here are 3 harmful types of bacteria that can be found in the world today. STREPTOCOCCUS AUREUS, ESCHERICHIA COLI, ENTERITIS SALMONELLA.

PREPARATION OF HERBS EXTRACTION DRYING

After harvesting, plant parts were analyzed for their moisture content of 60- 80%. The collected plant were dried with in a temperature range of 100-140°F. The moisture content of the plant was reduced to less than 14%with proper drying.

GARBLING PROCESS

Garbling Refer to the separation of that portion of the plant to be used from other parts of the plants, dirt and other extraneous matter.

GRINDING PROCESS

Grinding or mincing of an herb denotes mechanical breaking down of leaves, roots, seeds or other parts of a plant into very small units ranging from larger coarse fragments to fine powder. Grinding was employed in the production of initial phases of plant extract. Grinding or mincing of the leaves was carried out in a mixer. The fine powder obtained after grinding was used for extraction and the fine powered was stored under good condition to reduce the risk of the contamination.

SOLVENT EXTRACTION

Extraction was carried out by dissolving 6grams of *Alcaypha Indica* in 100ml of 80% ethanol. The mixture was kept overnight under shaking condition. The extract was filtered using Whatman No.1 filter paper. The filtrate was collected and evaporated at room temperature. Similar procedure was followed for methanol extract. The concentrated ethanol and methanol extract was stored at 4°C and used for further studies.

DIP AND DRY PROCESS

The cotton fabric should be dipped into the herbal extract for 24hrs. For even fixation into the cotton fabric, it should be stirred be well 45-60 minutes of the process. After 24hrs the fabric should be taken out and dried in a shaded place.

SUMMARY AND CONCLUSION

The main conclusion of this project is to give an antibacterial finish to cotton socks, to provide a medical textile for the person with cracked feet. From the result of this thesis it is concluded that the *acalyphaindica* leaves are having extreme antibacterial potency against human pathogenic bacteria such as *staphylococcus aureus*, *Escherichia coli* and *Salmonella*. The cotton knitted fabric was selected for the study. The cotton socks was treated with *Acalypha Indica* (Kuppaimeni). After extracting the sample were processed equally by finishing with natural herbs. The antibacterial activity on the sample was tested using the disk diffusion method by evaluating the effectiveness depending upon the microbial activity. The plant extracts studied could be an answer to the people seeking for better therapeutic agents from natural sources which is believed to be more efficient with little or no side effects when compared to the commonly used synthetic chemotherapeutic agents. In the present study, ethanol extract of leaves of *Acalypha indica* can be effectively used for healing of cracked feet bacterial diseases.

RECOMMENDATIONS

- Antibacterial finishes can be tried out in other natural fabrics.
- It can also be tried out on other skin diseases.

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